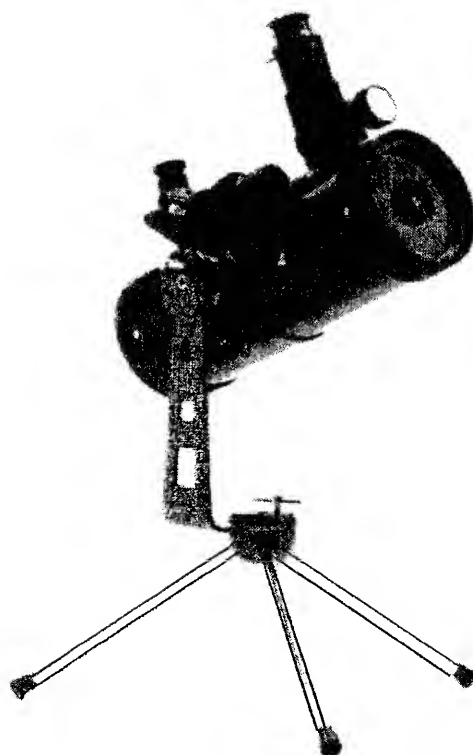


***CELESTRON®***

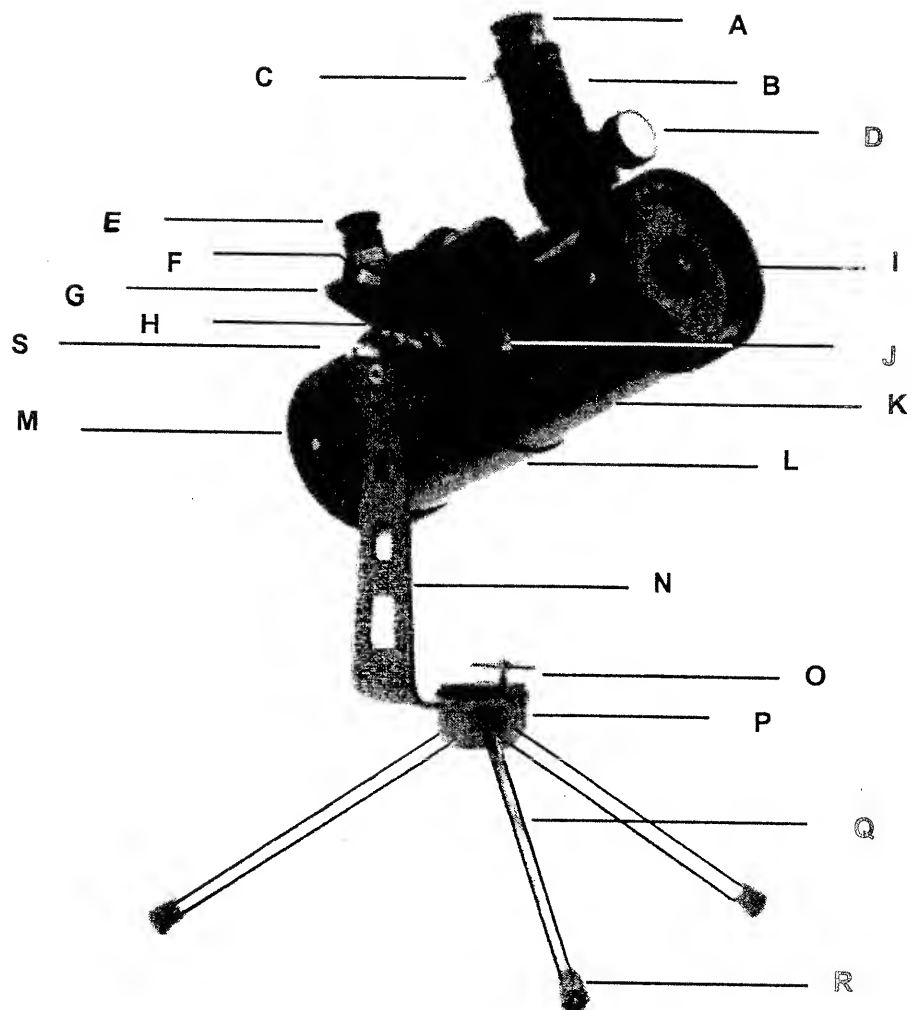


Model # 31034  
**TABLETOP 76 TELESCOPE**

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**INSTRUCTION MANUAL**

# TABLETOP 76



- |   |   |
|---|---|
| A. Eyepiece   | K. Telescope Tube                                 |
| B. Eyepiece Holder                                  | L. Tube Ring                                      |
| C. Thumbscrews                                      | M. Rear Housing (Primary Mirror Inside)           |
| D. Focus Knob                                       | N. Tube Tripod Telescope Arm                      |
| E. Finderscope Eyepiece                             | O. Clamp Lock — Azimuth (side-to-side) Adjustment |
| F. Thumbscrews (Adj. Screw)                         | P. Tripod Head                                    |
| G. Finderscope                                      | Q. Tripod Legs                                    |
| H. Tube Ring Adjustment Knob (hidden) — (not shown) | R. Tripod Feet                                    |
| I. Optical Window                                   | S. Clamp Lock — Vertical Adjustment               |
| J. Thumbscrew                                       |   |

## 1. INTRODUCTION

Thank you for purchasing this Celestron 76mm (3") Tabletop Telescope. This telescope is a precision scientific instrument. With it you will enjoy numerous objects in the sky—planets, nebulae, star clusters, galaxies and other astronomical objects.

The altazimuth mount is the simplest and easiest type of mount to use with two motions — altitude (up and down) and azimuth (side-to-side).

But, before your journey begins take time to read this manual to familiarize yourself with the operation and parts of your telescope.

**WARNING—NEVER LOOK AT THE SUN WITH YOUR TELESCOPE OR ITS FINDERSCOPE. PERMANENT AND IRREVERSIBLE EYE DAMAGE MAY RESULT AS WELL AS DAMAGE TO YOUR TELESCOPE.**

## 2. TELESCOPE ASSEMBLY

Please refer to Figure 1 (and the identifying parts list) as you assemble the telescope.

The telescope and all items are packed in one box. Included are:

### Model # 31034

- Telescope Optical Tube
- Table Tripod Mount
- Tripod Legs (3)
- 5x24 Finderscope and Bracket
- 4mm Eyepiece - .96" (150x)
- 20mm Eyepiece - .96" (30x)
- Barlow Lens - 2x - .96"

A. Remove the telescope tube, table tripod arm and tripod head from the box. These parts are assembled at the factory:

1. Take the tripod legs (Q) out of the box. Attach the three tripod legs by threading them clockwise into the threaded holes in the tripod head (P).
2. Rubber feet (R) are already installed on the tripod legs to prevent any damage from the metal tripod legs when set on a table or other flat surface.

B. Mounting the finderscope:

1. Remove the finderscope assembly (finderscope and bracket) from the box.
2. The finderscope with bracket (G) mounts in a socket on the telescope tube. Slide the finderscope bracket into the groove of the socket on the telescope and hold it in place by tightening the thumbscrew (J) firmly.

C. Mounting the eyepiece:

1. Take the low power (20mm) eyepiece (A) from the box and remove it from the plastic vial.
2. Remove the plug up cap from the eyepiece holder (B).
3. Insert the eyepiece into the eyepiece holder and hold in place with the thumbscrews (C).

### 3. TELESCOPE OPERATION — GETTING SET UP

A. To move the telescope in azimuth (side-to-side):

1. Loosen the clamp lock (O).
2. Hold a tripod leg (Q) and slowly rotate the telescope by turning the table tripod telescope arm (N) to the desired location.
3. Lock the clamp lock (O).

B. To move the telescope in altitude (up-down):

1. Loosen the clamp lock (S).
2. Hold the rear housing (M) and slowly rotate the telescope to the desired location.
3. Lock the clamp lock (S).

C. To rotate the telescope tube:

1. Loosen the tube ring adjustment knob (H).
2. Rotate the telescope tube slowly by turning the optical window cell (I) to the desired location.
3. Tighten the tube ring adjustment knob (H).

D. To focus the telescope and align the finderscope:

1. Remove the front lens cap (I).
2. With a low power eyepiece tight in the eyepiece adapter, position the telescope tube to look at any object about one mile or further away during the day. Put the object in the center of the field. To focus, turn the focusing knob (D) until your chosen object is in sharp focus. Remember to use outdoors only as you should not look through windows which may distort the image.
3. Look through the finderscope. If the object being observed is not visible in the finderscope or is not in the center of the finderscope crosshairs, then you need to align the finderscope. Use the finderscope adjustment screws (F) to align the finderscope with the main telescope by tightening and loosening these screws until the object is centered on the crosshairs. Once the finderscope is aligned with the main telescope, it makes it easy to find celestial objects. You find the desired object in the finderscope first (since it has a wide field) and then look at the narrow field but much more powerful main telescope for detailed views.
4. If the image in the finderscope is not sharp, then turn the finderscope eyepiece (E) until the image is sharp.
5. Do not be alarmed when you look through the telescope and the object is upside down and reversed left to right (the finderscope will only be reversed left to right). This is normal with an astronomical telescope.

## 4. UNDERSTANDING THE SKY

### A. *The Celestial - Coordinate System.*

The celestial-coordinate system is an imaginary projection of the Earth's geographical coordinate system onto the celestial sphere which seems to turn overhead at night. This celestial grid is complete with equator, latitudes, longitudes and poles.

The Earth is in constant motion as it rotates on its axis. Actually the celestial-coordinate system is being displaced very slowly with respect to the stars. This is called precession and is caused by gravitational influences from the Sun, Moon and other celestial bodies.

The celestial equator is a full  $360^\circ$  circle bisecting the celestial sphere into the northern celestial hemisphere and the southern celestial hemisphere. Like the Earth's equator, it is the prime parallel of latitude and is designated  $0^\circ$ .

The celestial parallels of latitude are called "coordinates of declination (Dec.)", and like the Earth's latitudes they are named for their angular distances from the equator. These distances are measured in degrees, minutes and seconds of arc. There are 60 minutes of arc in each degree, and 60 seconds of arc in each arc minute. Declinations north of the celestial equator are "+" and declinations south are "-". The north pole is  $+90$  and the south pole is  $-90$ .

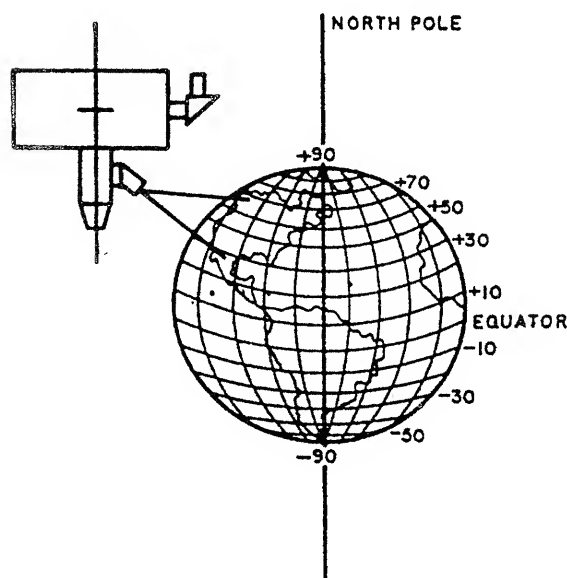


Figure 2

The celestial meridians of longitude are called "coordinates of right ascension (R.A.)", and like the Earth's longitude meridians they extend from pole to pole. There are 24 major R.A. coordinates, evenly spaced around the  $360^\circ$  equator, one every  $15^\circ$ . Like the Earth's longitudes, R.A. coordinates are a measure of time as well as angular distance. We speak of the Earth's major longitude meridians as being separated by one hour of time because the Earth rotates once every 24 hours (one hour =  $15^\circ$ ). The same principle applies to celestial longitudes since the celestial sphere appears to rotate once every 24 hours. Right ascension hours are also divided into minutes of arc and seconds of arc, with each hour having 60 minutes of arc and each arc minute being divided into 60 arc seconds.

Astronomers prefer the time designation for R.A. coordinates even though the coordinates denote locations on the celestial sphere, because this makes it easier to tell

how long it will be before a particular star will cross a particular north-south line in the sky. So, R.A. coordinates are marked off in units of time eastward from an arbitrary point on the celestial equator in the constellation Pisces. The prime R.A. coordinate which passes through this point is designated "0 hours 0 minutes 0 seconds". We call this reference point the vernal equinox where it crosses the celestial equator. All other coordinates are names for the number of hours, minutes and seconds that they lag behind this coordinate after it passes overhead moving westward.

Given the celestial coordinate system, it now becomes possible to find celestial objects by translating their celestial coordinates using telescope pointing positions. For this you use setting circles (if you have the Firstscope 76 EQ - equatorial mount models) for R.A. and Dec. to find celestial coordinates for stellar objects which are given in star charts and reference books.

## **B. Finding Objects with the Altazimuth Mount**

1. Loosen the clamp locks on the telescope mount (O and S), then move the telescope in the desired direction.
2. Look through the finderscope and pan the telescope until the object appears in the field of view.
3. The object will quickly move out of the field of view and you will have to slowly keep moving the telescope as the earth rotates on its axis.

## **5. MAGNIFICATION (POWER)**

The magnification (or power) of a telescope is variable depending upon the focal length of the eyepiece being used along with the focal length of the telescope.

- A. Your telescope has a focal length of 600mm.

To calculate the magnification we use the following formula:

$$\text{Magnification} = \frac{FL(\text{telescope})}{FL(\text{eyepiece})}$$

where FL(telescope) is the focal length of the telescope and FL(eyepiece) is the focal length of the eyepiece. So, if you use a 20mm eyepiece your magnification is  $600/20 = 30x$ .

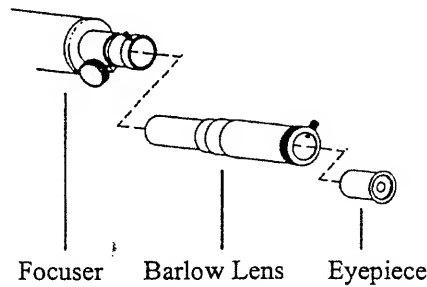
There are numerous optional eyepieces that are available to expand your range of magnification. There are various types of eyepieces of varying quality to choose from.

- B. Magnification through the telescope has its limits. These limits are determined by the laws of optics and the nature of the human eye. The maximum usable power is equal to 60 times the aperture of the telescope (in inches). So your telescope has a maximum useful power of  $180x$  ( $3" \times 60$ ). You can create power higher than this limit but the images will be dark and blurred with poor contrast.

The maximum power is used only under ideal conditions which are not common. Most of your viewing will be done in the range of  $25x$  to  $120x$ . Higher powers are used mainly for lunar and planetary observing under ideal seeing conditions.

- C. Your telescope also has supplied as standard equipment a 2x Barlow Lens - .96". The Barlow Lens doubles the power of any eyepiece that you use.

1. To use the Barlow Lens, insert the smaller barrel end into the focuser and tighten the thumb screw. Then insert a .96" eyepiece in the other end of the Barlow Lens and tighten the thumb screw.



## 6. TELESCOPE OPERATION — ASTRONOMICAL OBSERVING

After you have read and followed the instruction manual to this point, the telescope is set up and you are ready to begin your observing adventure.

To enable you to find objects you should have a set of Star Charts or a Planisphere. The location of the planets may appear in local newspapers.

- A. The Moon is an awesome first object to observe. The best observing occurs during the partial phases as a full Moon is too bright.

At low power you can see the complete Moon and at high powers you can see lunar details such as mountain ranges, craters and rills.

- B. Five of the planets are easy targets for your telescope.

See Jupiter with its great red spot, study the cloud bands and watch its moons shuttle back and forth.

Study Saturn and its splendid ring structure.

Observe Mars and see its polar cap.

Watch Venus and Mercury as they go through their moon-like phases.

- C. Deep-Sky objects (those outside our solar system) offer a lifetime of observing. There are hundreds of objects within the realm of your telescope including open and closed star clusters, planetary and diffuse nebulae, galaxies, double stars and occasional comets. The amount of detail you can see is dependent on your observing site (dark sky rural locations are best), atmospheric conditions, brightness of the object, collimation and your observing experience.

## 7. TELESCOPE OPERATION – TERRESTRIAL OBSERVING

You can also use your telescope to observe things on earth such as scenic views, wildlife, etc.

## 8. TELESCOPE MAINTENANCE

With proper care your telescope should rarely need any maintenance work.

- A. When not in use, always replace all lens covers to keep dust and contaminants off the optical surfaces.
- B. A small amount of dust on any optical surface is ok. If the dust builds up then use a can of compressed air and then a camel's hair brush to remove the dust.
- C. If the mirrors need cleaning, they should be cleaned by a professional. Either have your instrument serviced by a telescope repair facility or return it to the factory.
- D. Collimation or alignment of the optical system is done at the factory before shipment. There is no adjustment you can make and if the instrument is dropped or very roughly handled, it will have to be returned to the factory for proper alignment.

## SPECIFICATIONS

Optical System:	Newtonian Reflector (with corrective lens built in)
Aperture:	76mm (3")
Focal Length:	600mm
F/ratio:	f/8
Focuser	Rack and Pinion - .96"
Standard Oculars (or Eyepieces)	.96". size

NOTE: Specifications are subject to change without notice.

## 9. OPTIONAL ACCESSORIES

Celestron International offers a wide assortment of optional accessories to expand your interests.

- A. Sky Maps (#93722) - Invaluable when learning the night sky. They include all the constellations with the brighter deep-sky objects. On the front cover is a rotating planisphere which indicates when specific constellations are visible.
- B. Flashlight - LED (#93588) - Uses a red LED to allow reading star maps and locating telescope accessories and controls without ruining your night vision.
- C. Eyepieces - A whole assortment of .96" eyepieces are available to give you a wide range of magnifications.
- D. Planisphere & Planet Guide (#93720) — Simple and easy to use to find your way around the sky. Available in various latitude ranges — 30° (20 - 40°), 40° (30 - 50°), 50° (40 - 60°).
- E. Other - Numerous Accessories are available. See the Celestron Accessory Catalog (#93685) or ask your Celestron dealer for details.

# CELESTRON ONE YEAR LIMITED WARRANTY

- A. Celestron International (CI) warrants this telescope to be free from defects in materials and workmanship for one year from the date of purchase. CI will repair or replace such product or part thereof which, upon inspection by CI, is found to be defective in materials or workmanship. As a condition to the obligation of CI to repair or replace such product, the product must be returned to CI together with proof-of-purchase satisfactory to CI.
- B. The Proper Return Authorization Number must be obtained from CI in advance of return. Call Celestron at (310) 328-9560 to receive the number to be displayed on the outside of your shipping container.

All returns must be accompanied by a written statement setting forth the name, address, and daytime telephone number of the owner, together with a brief description of any claimed defects. Parts or product for which replacement is made shall become the property of CI.

**The customer shall be responsible for all costs of transportation and insurance, both to and from the factory of CI, and shall be required to prepay such costs.**

CI shall use reasonable efforts to repair or replace any product covered by this limited warranty within thirty days of receipt. In the event repair or replacement shall require more than thirty days, CI shall notify the customer accordingly. CI reserves the right to replace any product which has been discontinued from its product line with a new product of comparable value and function.

**This warranty shall be void and of no force of effect in the event a covered product has been modified in design or function, or subjected to abuse, misuse, mishandling or unauthorized repair. Further, product malfunction or deterioration due to normal wear is not covered by this warranty.**

CI DISCLAIMS ANY WARRANTIES, EXPRESS OR IMPLIED, WHETHER OF MERCHANTABILITY OF FITNESS FOR A PARTICULAR USE, EXCEPT AS EXPRESSLY SET FORTH HEREIN.

THE SOLE OBLIGATION OF CI UNDER THIS LIMITED WARRANTY SHALL BE TO REPAIR OR REPLACE THE COVERED PRODUCT, IN ACCORDANCE WITH THE TERMS SET FORTH HEREIN. CI EXPRESSLY DISCLAIMS ANY LOST PROFITS, GENERAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES WHICH MAY RESULT FROM BREACH OF ANY WARRANTY, OR ARISING OUT OF THE USE OR INABILITY TO USE ANY CI PRODUCT. ANY WARRANTIES WHICH ARE IMPLIED AND WHICH CANNOT BE DISCLAIMED SHALL BE LIMITED IN DURATION TO A TERM OF ONE YEAR FROM THE DATE OF ORIGINAL RETAIL PURCHASE.

Some states do not allow the exclusion or limitation of incidental or consequential damages or limitation on how long an implied warranty lasts, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

CI reserves the right to modify or discontinue, without prior notice to you, any model or style telescope.

If warranty problems arise, or if you need assistance in using your CI product, contact:

Celestron International  
Customer Service Department  
2835 Columbia Street  
Torrance, CA 90503  
Tel. (310) 328-9560  
Fax. (310) 212-5835  
Monday-Friday 8AM-4PM PST

This warranty supersedes all other product warranties.

**NOTE:** This warranty is valid to U.S.A. and Canadian customers who have purchased this product from an Authorized CI Dealer in the U.S.A. or Canada. Warranty outside the U.S.A. and Canada is valid only to customers who purchased from a CI International Distributor or Authorized CI Dealer in the specific country and please contact them for any warranty service.

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